

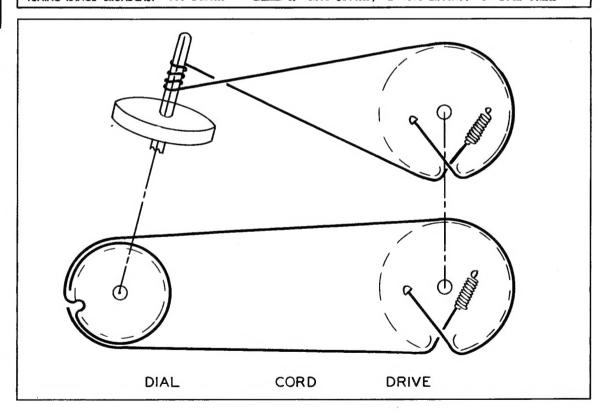
NATIONAL MODEL NC-33

TRADE NAME MANUFACTURER TYPE SET TUBES (SIX)

National, Model NC-33 National Co. Inc., 61 Sherman St., Malden, Mass. AC-DC Operated Multi-Band Commercial Type Superheterodyne Receiver Types, 12SA7 Converter, 12SG7 IF Amp., 12H6 Det.-AVC-Noise Limiter, 12SL7GT AF Amp.,-BFO, 35L6GT Power Output, 35Z5GT Rectifier.

POWER SUPPLY 105-130 Volts AC-DC TUNING RANGE-BROADCAST 500-1420KC

RATING .22 Amp. (a) 117 Volts AC Bands "A"-12.0-35.0MC, "B"-4.0-12.0MC. "C"-1.42-4.2MC



### HOWARD W. SAMS & CO., INC. • 2924 East Washington Street • Indianapolis 7, Indiana

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## PARTS LIST AND DESCRIPTIONS

CHASSIS-TOP VIEW

## TUBES (SYLVANIA or Equivalent)

	INSTALLATION NOTES							
DAAA	BASE	88	8BK		200	880	7AC	6AD
ENT DATA	STANDARD	12SA7	128G7		12H6	128L7GT	35L6GT	3525GT
REPLACEM	NATIONAL PART No.	12SA7	12867		12H6	12SL7GT	35L6GT	35Z5GT
	USE	Converter	IF Amp.	DetAVC &	Noise Lim.	AF Amp. & BFO	Power Output	Rectifier
	Ž ĕ Ž		c)	Ю		4	w	9

### CAPACITORS

in mfd. for Electrolytic

		l
Capacity values given in the rating column are in mid. for Electrolytic	and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.	
DE PE	Ceramic	
2		۱
	Mica	۱
ē	ۆ	l
Lanna	mmfd.	
	and	
	citors,	
	90	
) (1)	Paper	
9	a	

A A A A A A A A A A A A A A A A A A A	TAMPTONIA					
<b>3</b> 6455445	PART No.	AEROVOX	CORNELL- DUBILIER	SOLAR	SPRAGUE	AND
48 6955448	_	PART No.	PART No.	PART No.	PART No.	INSTALLATION NOTES
55544 <u>64646446</u>	00	AFSSD	UP4415	DY-2x40-150	EL-224*	EL-224* Filter
04426464464464	>	PRS50/10	BR105	M-10-50	TA-510	Output Cathode Bypass
		PR850/10	BR105	M-10-50	TA-510	AF Cathode Bypass
-10,40,40,40,40,40,40,40,40,40,40,40,40,40	0	4841	DT4P1	MPH-4-1	70-1	Line Filter
& igidididi	0	484-1	DT4P1	ST-4-1	72P2	Line Isolation
	0	684-03	DT683	ST-6-05	TC-13	Output Plate Byp See Note
0.0001	-0	4841	DT4P1	ST-4-1	TC-1	Noise Limiter Sias Filter
1.0.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1		484-01	DT481	ST-4-C1	TC-11	IF Screen bypass
10.00	0	4841	DT4P1	ST-4-1	TC-1	AVC Filter
10.00	_	484-01	DT4S1	ST-4-01	TC-11	
10000	0	4841	DT4P1	ST-4-1	TC-1	Conv. Screen Bypass
10000	0	4841	DT4P1	ST-4-1	TC-J	AVC Filter
10000	0	484-01	DT4S1	ST-4-01	TC-11	
10000	0	4841		ST-4-1	TC-1	RF Bypass
	0	1441W-01		NW.3-11	1FM-11	
2000	0	1441W-005		M. 5-25	1FM-25 //	Audio Coupling
270	-0	1468-0003		MO.5-325	1FM-325	AF Plate Bypass
220	0	1469-0002		108.5-32	1B-32	Fixed Trimmer
270	0	1469-00025	5R5T25	MOS.5-325	NS-325	BFO Grid Cap.
10000	_0	1441W-01				BFO Coupling
270	0	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
10000	9	1441W-01				Audio Coupling
470	9	1469-0005	SRSTS	MOS.5-35	NS-35	Osc. Grid Cap.
_	0					Fixed Padder
31 1300 500						=
_						
_	00	1441W-01				RF Sypass

\*Parallel sections to obtain desired capacity.
Note-Some models use two capacitors in parallel to obtain the desired capacity.

CONTROLS

	PATON NOTE I ATOM		AF Gain Control	Attach to 34A per instructions	ORS		IDENTIFICATION CODES		Red-Red-Or. Osc. Grid	OrOrBlk. Parasitic Supp.	GrnBr. " "	BrHlkRed Conv. Screen Decoup.	Red-Red-Grn. AVC Network	BrGrnBr. IF Cathode	3rBlkRed IF Screen	BrBlkGrn. Noise Limiter Bias Network	BrblkGrm. " " "	Red-V1Yl. " " " "	YlV1Yl. Diode Load
ATA	CABOSTAT	PART No.	Z-09-W	Not Req.	RESISTORS	\TA	SC.	PART No.		5		BTS-1000 Br	BTS-2.2 Meg.   Re	Br				BTS-270K Re	+
REPLACEMENT DATA	Jai	PART No.	D13-133	A 41		REPLACEMENT DATA		_	BTS-22K			BTS-	BTS		BTS-1000	BTST	BTS-	BTS-	BTS-
REP	MATTONAT	PART No.				REPL	NATIONAL	PART No.			_	_		_					
Ц		WATTS		_			ō	WATE	- Ros	-Pu	þ	-ju	-pu	-jo	-IN	- 20	-pı	-tre	-04
014844		ANCE W	500Kg	Shaft Switch			RATING	RESISTANCE   WATTS	SZKS	333	1502	10008	2.2 Meg.	1502	10002	1 Meg.	1 Meg.	270Kg	470K2
	TEX	ź	344	шΟ			¥ c	į	in Co	36	37	38	ල භ	40	41	3	3	44	45

71)	1 A1 A2 5 3 59 58 57
A16 A18 A12 T5	
A13	69 6
A17	56 68 2 AM 7 A3

# PARTS LIST AND DESCRIPTIONS (Continued) RESISTORS

CHASSIS—BOTTOM VIEW

A9 62

A6

**6**7 20

AB-

	-	1010	C MANAGE					
6	Ι,	7	KENLACEMENI DAIA	V				
¥¥IIV¢		NATIONAL		2		DENTIFIC	DENTIFICATION CODES	DES
RESISTANCE	WATTS	PART No.	_	PART No.				
2.2 Meg.	- 04-		BTS-	BTS-2.2 Meg.	Red-Red-Grn	Red-Red-Grn. AVC Network	Y.	
47K9	ku-k		BTS-47K	47K	Y1 - V1 - Or	vivior. Fitament Shund	oad	
1 Meg.	ı-þi		BTS-	BTS-1 Meg.	BrBlkGr	BrBlkGrn. Blas Network	ork	
39008	- pu		BTS	BTS-3900	OrWhite-R	OrWhite-Red AF Cathode	le	
270Kg	-jo		BTS-	270K	Red-V1Yl.	Red-V1Yl. AF Plate Load	ad	,
47KS	- to		BTS	47K	Y1V1Or.	YlViOr. CWO Grid		
470KS	-jou		BIS	BTS-470K	TVIYI.	Output Gric		
2202	-1-		BW-1	BW-1-220	Red-Red-Br.	Output Cath	ode	
8202	- PA		BTS-820	820	Gray-Red-Br	. Dial Light Shunt	Shunt	
				FILTER	FILTER CHOKE			
	PATINGS		-		PEPLACEMENT DATA	DATA		
TOTAL	,	$\vdash$	INDUCTANCE	ı	CTANCOB	TUOBDABEON	MEDIT	INSTALLATION
DIRECT	RESISTANCE			NATIONAL PART NO	PART NO.	PART NO.		NOTES
.052A	2152	5.5	8	K-317-2-1	c-1325	T20052#	C-2977	#Drill new mounting
			TRANS	FORM	TRANSFORMER (OUTPUT	(T)		
	Cidita	۲		REPLACE	REPLACEMENT DATA			
2	Chilli		NATIONAL	STANCOR	THORDARIN	MERIT	SN	INSTALLATION NOTES
IMPEDANCE BOIL CEC	2 2	3	DADT MA	PART No.	_	_		
Ci	1102	+	K-588-1	A-3876	T22845	A-2928		
				SPE	SPEAKER			
			REPI	REPLACEMENT DATA	ATA	_		
						Т		
7	RATINGS	Z <b>a.</b>	NATIONAL PART No.	PART No.	PART No.		INSTALLA	INSTALLATION NOTES
FIELD	I VC IMP.			ST-107	L			
PM	3.48			Mod. P5-V	V 5A15			
CONE DIA.	VC DIA.	Т						
				RF	R F COILS			
			REPLA	REPLACEMENT DATA	VIA			
USE	DC RES.	RES.	NATIONAL		MEISSNER			
	Ē.	SEC.	PART No.	+	PAKI No.			

	,	RATINGS				REPLACEMENT DATA	DATA		
₹o	TOTAL DIRECT CURRENT	D. C. RESISTANCE	=	NDUCTANCE TO CURRENT 1000 (_)	NATIONAL PART NO.	STANCOR PART NO.	THORDARSON MERIT PART NO. PART NO.	MERIT PART No.	INSTALLATION NOTES
56	.052A	3312	S.	5 Henrice	5.5 Henrice K-317-2-1	c-1325	T20052#	C-2977	#Drill new mounting holes.
				TRAN	ISFORME	IRANSFORMER (OUTPUT)	UT)		
l	•	O ALE	Γ		REPLACE	REPLACEMENT DATA			
TEX.		MING		NIAM TONIA	_		L		
ò	IMPEDANCE	E DC RES.	S	NATIONAL	-		_	INST	INSTALLATION NOTES
	PRI. SEC.	PRI.	SEC.	PART No.	PARI No.	PAKI No.	Y X X Yo		
57	20002 3.42	2 110g	48	K-588-1	A-3876	T22845	A-2928		
					SPE	SPEAKER			
Γ			Ш	×	REPLACEMENT DATA	DATA			
Š Ę	\$	RATINGS		NATIONAL	JENSEN	OUAM		INSTALLAT	INSTALLATION NOTES

			SPEAKER	ER	
		REP	REPLACEMENT DATA	٧	
Š Ę	<b>EATINGS</b>	NATIONAL PART No.	JENSEN PART No.	OUAM PART No.	INSTALLATION NOTES
	FIELD   VC IMP.		ST-107	ı	
ထ္ထ	PM 3.42		Mod. P5-V	5A15	
	CONE DIA. I VC DIA.				
က္က	4-5/8"   9/16"				
			R F COILS	OILS	

MENT DATA	MEISSNER	PART No.	~						16-5740	16-5742	DIA! IGHT
REPLACEMENT DATA	NATIONAL	PART No.									2
	RES.	SEC.	4.52	1.72	00	1.82	.48	85	7.50	7.82	
	DC RES.	£	2.62	9,00	S				7.28	7.72	
	USE		Band Ant. Coil D	D #	=	Osc. Coil D		ω. = =	Input IF	Output IF	
	ž Ž		90	62	63	64	9	99	689	980	

6-8 0.15 Brown PART No. Type 47	BASE TYPE VOLTS	AMPS.	BEAD	REPLACEME NATIONAL	ENT DATA	INSTALLATION N
	9 <b>-</b> 9	0.15	Brown	PART No.		Type 47
		-				

33 63 A7 A11 A15 A21 6	0 61 64 18 (	37 35 11 41 40 15	(46) (44) (13) (42)	(10) (55) (51)	
			TO AS	\$0 \$ \$3 \$22 \$5 \$6 \$6 \$25 \$4 \$4 \$45	
BULLI				(25) (25) (24) (45) (47)	
Tunned To Samuel	<b>A20</b> (32)(65)(73		6 (53) (48)	28	
ocad ocad ocad ocad code shunt PARINA	INSTALLATION NOTES	INSTALLATION NOTES		INSTALLATION NOTES	
BY Crabbe Dougle By Crabbe Dougle Cathode AF Plate Load CWO Grid CWO Grid Output Cathode Dial Light Shunt AIA THORDARSON MERIT TROCES# G-2977 TROCES# G-2977 UT)	MERIT PART No. A-2928			DATA Type  NOTES	e-ANL

No.	PART NAME	NATIONAL PART No.	NOTES
72	Switch		Band
73	2		Send-Receive
74	=		CW-Phone-ANL
75	Main Tuning Geng		
26	Bandspread Gang		

### ALIGNMENT INSTRUCTIONS-READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

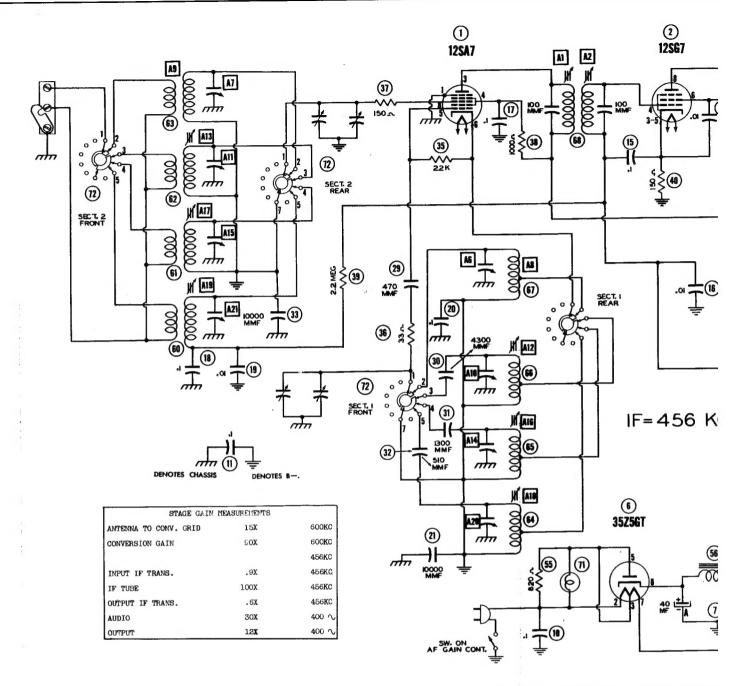
To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Set AF gain control at maximum, "Send-Rec" switch at rec., reception switch to phone, pitch control to midscale and bandspread dial to "set", except where otherwise noted. Output of sig. agen. should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for all adjustments.

SIGNAL SIGNAL SIGNAL BAND RADIO OUTPUT ADJUST REMARKS

	DUMMY	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Direct	Across antenna terminals "A", with link dis- connected.	456KC	Band "D"	SETTING Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to re- duce hum modulation.
2	Direct		456KC (Unmodu- lated)	ď			A5	duce hum modulation. Reception switch to "CW". Loosen set screw on pitch control shaft and remove knob and shaft. Adjust A5 for zero beat. Replace shaft and knob so that white dot is at midscale. Place set screw directly opposite stop and tighten
3	300Ω carbon res.	High side to either ant. term- inal. Low side to other ant. terminal with link disconnected		Band"A'	34nc	A <b>c</b> ross voice coil	A6	Adjust for maximum output Check for image by tuning sig. gen. to 33.09MC. If signal is not heard retune sig. gen. to 34MC and close A6 to next peak. Aljust for maximum output and recheck for image.
4	11	- 11		, a	Tune for maxi	"	A7	Rock tuning cap. and ad- just for maximum output.
5	я	"	12MC	н	12MC	Ħ	A8,A9	Adjust for maximum output. Adjust for maximum output Repeat steps 3, 4 and 5 until no further improve- ment can be made.
6		n	111/10	Band B	111%C	11	A10	Adjust for maximum output Check for image by tuning sig. gen. to 11.91MC. If signal is not heard, retune sig. gen. to 11MC and open A10 to next peak. Adjust for maximum output and recheck for image.
7	tt	"	#	"	Tune for max- imum output.	H	A11	Rock tuning cap. and ad- just for maximum output.
8	н		4MC	"	4MC	n	A12, A13	Adjust for maximum output Repeat Steps 6, 7 and 8 until no further improve- ment can be made.
9	¥	11	a a	Band "C		**	Al4	Adjust for maximum output Check for image by tuning sig. gen. to 4.91MC. If signal is not heard retune sig. gen. to 4MC and open Al4 to next peak. Adjust for maximum output and recheck for image.
.0	fi	"	10	#	Tune for max imum output.	"	A15	Rock tuning cap. and ad- just for maximum output.
11	ęr .	,	1.5MC	Ħ	1.5MC	,	A16, A17	Band spread dial to "0". AdjustAl6&Al7 for max.cut. Repeat Steps 9, 10 & 11 until no further improve-
2	11	,	500KC	Band"D"	500KC	-	Al8, Al9	ment can be made. Bandspread to "O". Adjust Al8 and Al8 for maximum output. Return bandspread dial to "Set".
13	n	,	1400KC	v	1400KC		A20	Adjust for maximum output Check for image by tuning sig. gen. to 2.31MC. If signal is not heard, retune sig. gen. to 1400KC and open A20 to next peak Adjust for maximum output and recheck for image.
14	pi .	п	II.	н	Tune for max imum output.		A21	Rock tuning cap. and adjust for maximum output. Repeat Steps 12, 13 and 14 until no further improvement can be made.



### VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

### VOLTAGE READINGS

hem	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	ov.	25VAC	115V <b>D</b> C	105VDC	-9.8VDC\$	ov.	40VAC	2VDC
2	12SG7	ov.	55VAC	1.2VDC	1VDC	1.2VDC	110VDC	40VAC	115VDC
3	1246	ov.	14VAC	1VDC	1VDC	2VDC	OV.	25VAC	OV.
4	12SL7GT	ov.	50VDC	1VDC	-2.8VDC§	75VLC	ov.	14VAC	OV.
5	35L6GT	ov.	90VAC	110VDC	115VDC	ov.	OV.	55VAC	7.8VDC
6	35Z5GT	ov.	117VAC	115VAC	ov.	115VaC	115VDC	90VAC	125VDC
	000001		ŞTAKEN	WITH VA	CUUM TUBE	VOLTMETER.		f	TAKEN WI'

Pir IN 128A7 2 12SG7 IN 3 IN 1246 4 50 12SL7GT 5 35L6GT IN 35Z5GT

TAKEN WITH "CW-PHONE-ANL" SWITCH IN "ANL" POSITION.

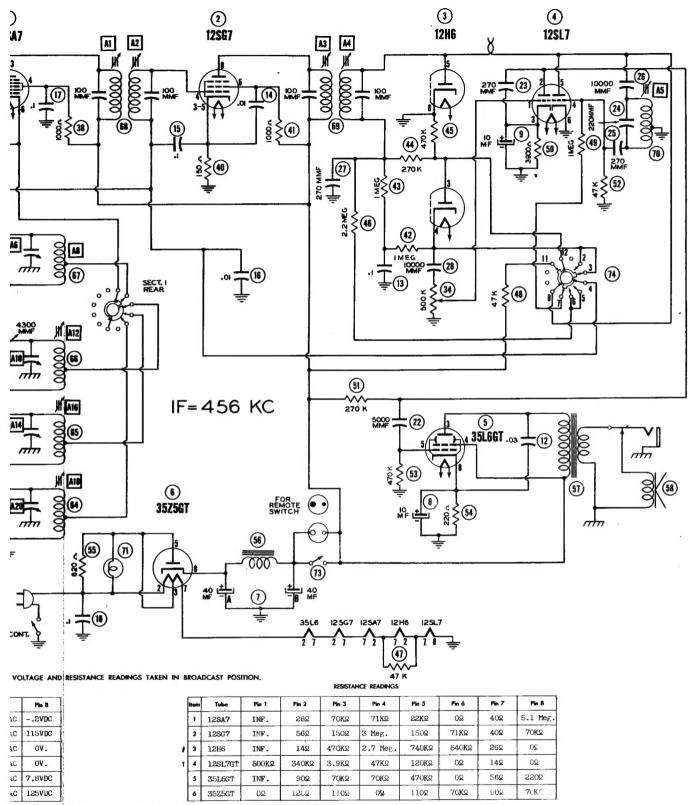
TTAKEN IN CW POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
 Socket connections are shown as bottom views.
 Measured values are from socket pin to common negative.
 Line voltage maintained at 117 volts for voltage readings.
 Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
 Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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#TAKEN WITH "CW-PHONE-ANL" SWITCH IN "ANL" POSITION.
| PAREN IN CW POSITION.

LESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY LCCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.